

NuPRO[®] -710 Series
Full Size Socket-370 All-in-one
PICMG[™] Bus Industrial SBC
User's Guide



Recycled Paper

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Challenge Description			
Suggestions for ADLINK			

Table of Contents

Chapter 1 Introduction.....	1
1.1 FEATURES	1
1.2 The NUPRO-710 Package	3
1.3 Board Layout, Jumpers and Connectors	4
Chapter 2 Installation	6
2.1 Static Electricity Precautions	6
2.2 Installation Steps	7
2.3 CPU Type and BUS Clock Speed Selector	7
2.4 RTC Clear CMOS Memory: JP9	9
2.5 Set DOC Memory base address	9
2.6 Watchdog Timer setting.....	10
2.7 System Memory Installations	11
2.8 Expansion Card installations	11
Chapter 3 Connectors.....	13
3.1 CPU/CHASSIS FAN Connector	13
3.2 IRCON Connector	14
3.3 LCD Connector	14
3.4 USBP Connector	15
3.5 ATX Connector	15
3.6 PS-ON Switch.....	16
3.7 KEY Lock Connector	16
3.8 Speaker Connector	17
3.9 Reset Switch Connector	17
3.10 Power LED Connector	18
3.11 SMI LED Connector	18
3.12 SMI Switch Connector	19
3.13 IDE_LED	19
3.14 Internal KB Connector	20
3.15 Primary, Secondary IDE Connector	20
3.16 Parallel Printer Connector	21
3.17 Floppy drive connector	21
3.18 COM2 Connectors.....	22
3.19 COM1 Connector (9-pin female).....	22
3.20 PS/2 Mouse Connector (6-pin female).....	23
3.21 PS/2 KB Connector (6-pin female)	23

3.22	VGA Connector	24
3.23	RT1: Hardware Monitoring connector	24
Chapter 4 BIOS Setup.....		25
4.1	UPDATING NUPRO-710 BIOS (Software Flash)	25
4.2	Standard CMOS Setup.....	28
4.3	BIOS Features Setup.....	32
4.4	Intel 440BX Chipset Features Setup.....	35
4.4.1	Cache Features.....	37
4.4.2	PCI and IDE Configuration.....	37
4.5	Power Management Setup.....	39
4.5.1	PM Timers	40
4.5.2	Reload Global Timer Events	42
4.6	Intel 440BX PnP/PCI Configuration Setup	42
4.7	Load BIOS Defaults.....	44
4.8	Load Setup Defaults	45
4.9	Integrated Peripherals.....	46
4.10	Setting Supervisor & User Passwords	49
4.11	IDE HDD Auto Detection	50
4.13	Save and Exit Setup.....	51
Chapter 5 ATI 3D RagePro XL Features.....		52
5.1	General Features.....	52
5.2	Integrated TMDS.....	53
5.3	Digital Flat Panel Monitor Support.....	53
5.4	LCD Panel Control.....	53
5.5	ACPI Power Management.....	54
5.6	AGP 2X mode	54
5.7	Floating-Point Set-up Engine	55
5.8	125MHz SGRAM	55
5.9	2D Acceleration	56
5.10	3D Acceleration	56
5.11	Motion Video Acceleration.....	58
5.12	Software Features.....	59



Introduction

This manual explains how to use this *SINGLE-BOARD COMPUTER* board and install upgrades. It has an overview of the design and features of the board and provides useful information if you want to change the configuration of the board, or a system it is installed in.

The NUPRO-710 Single-board Computer is designed as an All-In-One complete system. Plugged into a passive backplane. The NUPRO-710 will be compatible with PICMG Ver 2.0 PCI/ISA Standard and Intel PCI Ver.2.0/2.1 compliant.

Upgrading your system with a high performance, without the high cost. For industrial users who need more processing power, it is perfect as a building block for the IPC workstation used for factory automation, data acquisition or distributed process control.

The perfect choice for building a LAN server, a High-End workstation a multi-user or industry PC system.

1.1 FEATURES

The ADLINK NUPRO-710 is carefully designed for the demanding Industrial PC user who wants great many features in a small package. This Single-board Computer:

- **Easy Installation:** Is equipped with BIOS that supports auto detection of hard drives, PS/2 mouse, and Plug and Play devices to make setup of hard drives, expansion cards, and other devices virtually automatic.
- **Intel Processor:** Supports one Celeron PPGA CPU and Intel Pentium III FC-PGA CPU (Coppermine core) on Socket 370.
- **Intel AGPset:** Features Intel's 440BX AGPsets with I/O subsystems and Intel's FSB (Front-Side Bus) platform, which boasts a 100/66MHz internal bus speed.
- **USB Interface:** Supports the Universal Serial Bus.

- IrDA Connector: Supports an infrared port module for wireless interface.
- ATI Rage Pro XL Graphics Controllers (only for NUPRO-710): On-board 64-bit graphics accelerator with support for Digital Flat panel monitors and superior support for 3D and motion video, with 8MB SGRAM.
- Desktop Management Interface (DMI): Supports DMI through BIOS that allows hardware to communicate within a standard protocol creating a higher level of compatibility.
- Versatile SDRAM Memory Support: Is equipped with three DIMM sockets to support (8MB, 16MB, 32MB, 64MB, 128MB, 256MB) SDRAM/EDO 168-pin memory module.
- Super Multi-I/O (Winbond 83977TF_AW Chipset): Provides two high-speed UART compatible serial ports and one parallel port with EPP and ECP capabilities. UART2 can also be directed from COM2 to the Infrared Module for wireless connections. Two floppy drives of either 5.25" or 3.5" (1.44MB or 2.88MB) are also supported without an external card.
- H/W monitoring: Winbond 83781D Chipset, monitoring (+/-)Voltage, System Temperature and fan speed.
- Ready-to-Use Connectors: Is equipped with onboard Parallel (Printer) Port, Serial Ports (COM1&2), PS/2 Mouse, and PS/2 Keyboard connectors without the need for extra cables and brackets.
- PCI Bus Master IDE Controller: Comes with an onboard PCI Bus Master IDE controller with two connectors that supports four IDE devices in two channels, provides faster data transfer rates, and supports Enhanced IDE devices such as Tape Backup and CD-ROM drives. This controller supports UltraDMA/33, PIO Modes 3 and 4 and Bus Master IDE DMA Mode 2. BIOS now support IDE CD-ROM or SCSI boot-up.
- PICMG Compatible: 32 bits PCI-ISA CARD EDGE Connector supports 32-bit Bus Master 4 x PCI Expansion slots and 16-bit ISA Expansions slots.
- Watchdog Timer: The function can generate a system reset. Jumper configurable to always disable or software programmable enable/disable. The timer interval is 10-80sec.
- Uses I/O ports hex 043 and 443 to control the watchdog timer.
- DMA channels: 7
- Interrupt levels: 15
- Physical Size: 13.33" x 4.8"
- Power Requirement: +5V/4.5AMPS.

1.2 The NUPRO-710 Package

Item Checklist

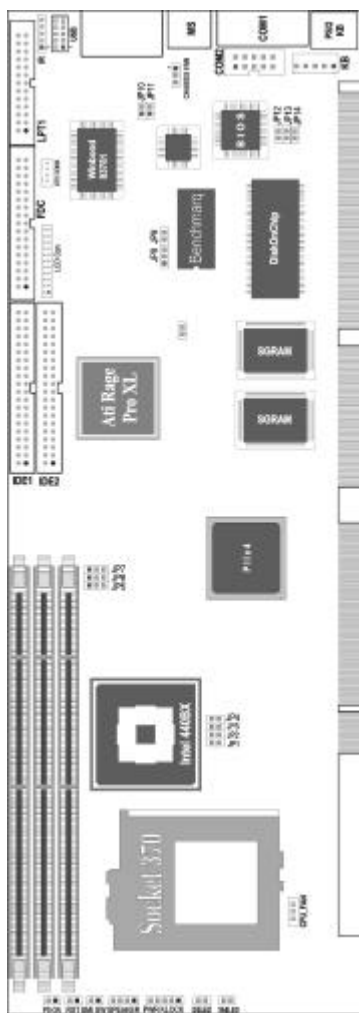
Please check that your package is complete. If you discover damaged or missing items, please contact your retailer.

The NUPRO-710 Single-board Computer Package comes with the following:

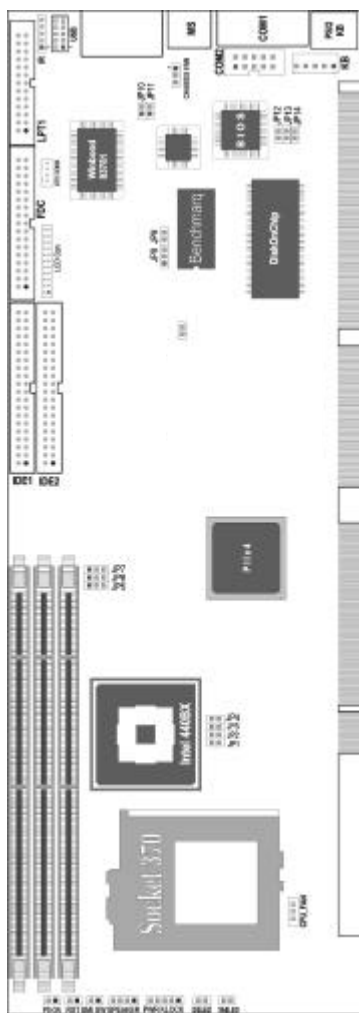
- The NUPRO-710 Single-board Computer with built-in 2 Serial, 1 Parallel, PS/2 Keyboard, PS/2 Mouse connectors
- 1 IDE ribbon cable, 1 Floppy Disk ribbon cable
- one NUPRO-710 user's manual & CD
- Small bag for spare jumpers & screws.
- Temperature sensor for two pins connector into RT1 and V shape metal

1.3 Board Layout, Jumpers and Connectors

NUPRO-710



NUPRO-711



Jumpers:

JP1, JP2, JP3, JP4:	Bus & External Clock Selector
JP5, JP6, JP7:	CPU to Bus Frequency Ratio
JP9:	RTC Clear CMOS Memory
JP8, JP10/JP11:	Watchdog Timer Setting
JP12, JP13, JP14:	Set DiskOnChip will be mapped to Memory base address

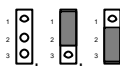
Connectors:

Fan Connector:	Connector for CPU cooler & chassis fan
IRCON Connector:	Connector for Optional IrDA-Compliant Infrared Port module
LCD Connector:	28 pins Connector for LCD
USB Connector:	Connector for USB port
ATX Connector:	Connect to backplane ATX connector
PS-ON:	Two pin for Case power switch
Reset Switch Connector:	Two pin Connector for a Reset Switch
IDE_LED:	Two pin Connector for an IDE Activity LED
Speaker Connector:	4 pins Connector for a System Case Speaker
Key Lock Connector:	Connector for a Keyboard Lock
Power LED Connector:	Connector for a Power-On Indicator LED
SMI Switch Connector:	Connector for a Suspend Switch lead
SMI LED Connector:	Connector for a Suspend Switch lead
Primary, Secondary IDE Connector:	Two 40-pin Block
Parallel Printer Connector:	26-pin Block
Floppy Drive Connector:	34-pin Block
COM2 Connector:	10-pin Block
COM1 Connector:	9-pin Female
PS/2 Mouse Connector:	6-pin Female
PS/2 KB Connector:	6-pin Female
VGA Connector: (Only for NUPRO-710)	15-pin Female
RT1:	2-pins, hardware monitor connector

2

Installation

Several hardware settings are made through the use of jumper caps to connect jumper pins (JP) on the Single-board Computer. See “ Map of the Single-board Computer ” for locations of jumpers. The jumper setting will be described numerically such as



for no connection, connect pins 1 & 2, and connect pin 2 & 3 respectively.

Pin 1 for our Single-board Computers is always on top or on the left when holding the Single-board Computer with the keyboard connector away from you. A “ 1 ” is written besides pin 1 on jumpers with three pins. The jumpers will also be shown graphically such as to connect pins 1 & 2 and to connect pin 2 & 3. Jumpers with two pins will be shown as for Short (On) and for Open (Off). For manufacturing simplicity, the jumpers may be sharing pins from other groups. Use the diagrams in this manual instead of following the pin layout on the board. Settings with two jumper numbers require that both jumpers be moved together. To connect the pins, simply place a plastic jumper cap over the two pins as diagrammed.

2.1 Static Electricity Precautions

Under the right conditions, static electricity will build up. If you touch the board or other sensitive components, the build-up will discharge into the components and circuitry. Computer components are sensitive to damage from static electric discharge. They can be damaged or destroyed if the discharge is powerful enough. Static build-up is most likely to occur in dryer and cooler conditions but it is always important to be cautious.

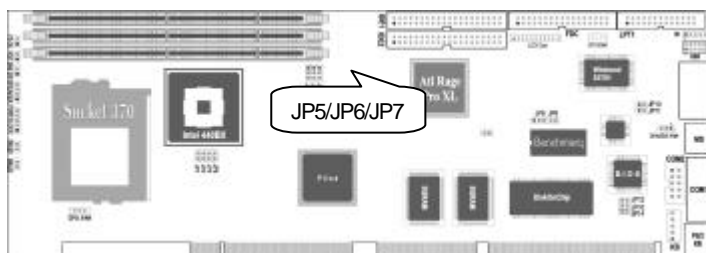
2.2 Installation Steps

Before using your computer, you must follow the six steps as follows:

1. Set Jumpers on the Single-board Computer
2. Install SDRAM on board
3. Install Celeron CPU or Pentium III FC-PGA CPU into Socket 370.
4. Plug into PICMG PCI/ISA Backplane
5. Connect Ribbon Cables, Cabinet wires, and Power supply
6. Setup the BIOS Software

2.3 CPU Type and BUS Clock Speed Selector

JP5/JP6/JP7, JP1/JP2/JP3/JP4

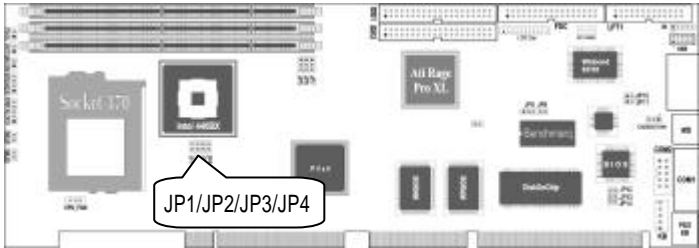


Bus & CPU External Clock Selector: JP5, JP6 and JP7









































These jumpers tell the clock generator what frequency to send to the CPU. These allow the selection of the CPU's External frequency (or BUS Clock). The BUS Clock times the BUS Ratio equals the CPU's internal frequency. (The advertised CPU Speed) Set the jumpers by the internal speed of the Intel CPU as follows:

External	JP5		JP6		JP7	
66MHz	1-2		1-2		2-3	
100MHz	1-2		1-2		1-2	

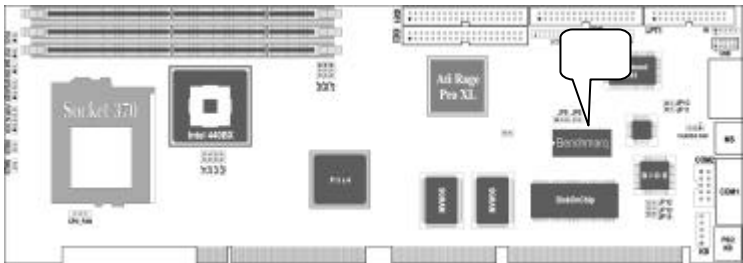
CPU to Bus Frequency Ratio: JP1, JP2, JP3, and JP4





These jumpers set the frequency ratio between the internal frequency of the CPU and the External frequency (Called the BUS Clock) within the CPU. These must be set together with the above jumpers CPU External (BUS) Frequency Selector. Set the jumpers by the internal speed of the Intel CPU as follows:

CPU/Bus clock	JP1		JP2		JP3		JP4	
8.0 x	OPEN		SHORT		SHORT		OPEN	
7.5 x	OPEN		OPEN		OPEN		SHORT	
7.0 x	OPEN		SHORT		OPEN		SHORT	
6.5 x	OPEN		OPEN		SHORT		SHORT	
6.0 x	OPEN		SHORT		SHORT		SHORT	
5.5 x	SHORT		OPEN		OPEN		OPEN	
5.0 x	SHORT		SHORT		OPEN		OPEN	
4.5 x	SHORT		OPEN		SHORT		OPEN	
4.0 x	SHORT		SHORT		SHORT		OPEN	
3.5 x	SHORT		OPEN		OPEN		SHORT	

2.4 RTC Clear CMOS Memory: JP9

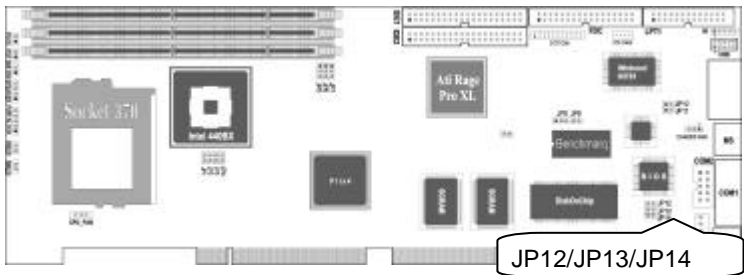


You can use this jumper to clear the CMOS memory that stores the BIOS Setup Utility configuration record, including any passwords. After clearing the CMOS memory you must run the BIOS Setup Utility again to create and store a new configuration record.










RTC Clear Selector	JP9	
Normal (default)	1-2	
Clear (must input voltage)	2-3	

2.5 Set DOC Memory base address

JP12, JP13 and JP14

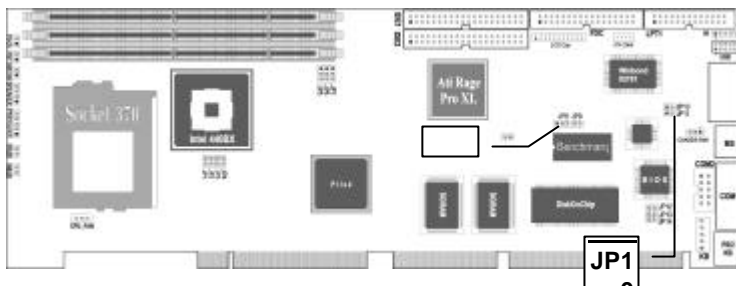


The DiskOnChip should be mapped to occupy an 8KB window of expansion BIOS space, which is usually located between 0C0000H to 0EFFFFH.

Memory window base address	JP12		JP13		JP14	
C8000-CFFFF	OPEN		SHORT		OPEN	
D0000-D7FFF (Default)	SHORT		OPEN		OPEN	
D8000-DFFFF	OPEN		OPEN		SHORT	

2.6 Watchdog Timer setting




JP8, JP10/ JP11











The Watch-Dog Timer is enabled by reading port 443H. The Watch-Dog Timer should be triggered before the Watch-Dog Timer time-out period ends, otherwise the Watch-Dog Timer assumes the program operation is abnormal and will issue a reset signal to start again, or activate NMI (by Pull-Low IOCHK#) to the CPU. The Watch-Dog Timer is disabled by reading port 043H.

The Watch-Dog Timer time-out period can be set 10sec, 15sec, 25sec and 80sec.

Watchdog Timer setting

WT DOG	JP8		
NMI	1-2		
Reset	2-3		Default
Disabled	OPEN		

WDT Time-Out Period setting: JP10, JP11

WDT Period	JP10		JP11		
80sec.	OPEN		OPEN		
25sec.	OPEN		SHORT		
15sec.	SHORT		OPEN		
10sec.	SHORT		SHORT		(default)

2.7 System Memory Installations

The NUPRO-710 supports three 128-pin DIMMs for SDRAMs or EDO DRAMs of either 8MB, 16MB, 32MB, 64MB, 128MB or 256MB to form a memory size between 8MB to 768MB.

IMPORTANT: Do not mix SDRAMs or EDO DRAMs .

To use Error Checking and Correction (ECC), you must used a DIMM module with 9 chips per side (e.g. 8 chips + 1 parity chips) and make the proper settings in the BIOS Chipset Feature Setup.

Install memory in any combination as follows:

DIMM socket	168-pin DIMM Memory Module
DIMM Slot 1	8MB, 16MB, 32MB, 64MB, 128MB, 256MB SDRAM or EDO
DIMM Slot 2	8MB, 16MB, 32MB, 64MB, 128MB, 256MB SDRAM or EDO
DIMM Slot 3	8MB, 16MB, 32MB, 64MB, 128MB, 256MB SDRAM or EDO
Total System Memory =	

2.8 Expansion Card installations

First read your expansion card documentation on any hardware and software setting that may be required to setup your specific card.

Expansion Card Installation Procedure

1. Read the documentation for your expansion card.
2. Set any necessary jumpers on your expansion card.
3. Carefully align the card's connectors and press firmly.
4. Setup the BIOS if necessary.
5. Install the necessary software drivers for your expansion card.

Assigning IRQs for Expansion cards

Some expansion cards need to use an IRQ to operate. Generally an IRQ must be exclusively assigned to one use. In a standard design there are 16 IRQs available but most of them are already in use by parts of the system which leaves 6 free for expansion cards.

Both ISA and PCI expansion cards may need to use IRQs. System IRQs are available to cards installed in the ISA expansion bus first, and PCI cards then use any remaining IRQs. Currently, there are two types of ISA cards. The original ISA expansion card design, now referred to as " Legacy " ISA cards, requires that you configure the card's jumpers manually and then install it in any available slot on the ISA bus. You may use Microsoft's Diagnostic (MSD.EXE) utility included in the Windows directory to see a map of you' re used and free IRQs. For Windows 95 users, the "Control Panel" icon in " My computer" contains a "System" icon which give you a "Device Manager" tab. Double clicking on a specific device give you "Re sources" tab which shows the Interrupt number and address. Make sure that no two devices use the same IRQs or your computer will experience problems when those two devices are in use at same time.

To simplify this process this Single-board Computer has complied with the Plug and Play specification, which was, developed to allow automatic system configuration whenever a PNP Compliant card is added to the system. For PNP card, IRQs are assigned automatically from those available.

If the System has both Legacy and PNP ISA Cards installed, IRQs are assigned to PNP cards from those not used by Legacy cards. The PCI and PNP configuration of the BIOS setup utility can be used to indicate which IRQs are being used by Legacy cards. For older Legacy cards that does not work with the BIOS. You can contact your vendor for an ISA Configuration Utility.

An IRQ number is automatically assigned to PCI expansion cards after those used by Legacy and PNP ISA cards. In the PCI bus design, the BIOS AUTO assigns an IRQ to PCI slot that has a card in it that requires an IRQ. To install a PCI card, you need to set something called the INT (Interrupt) assignment. Since all the PCI slots on the NUPRO-710 use an INTA#, be sure that the jumpers on your PCI cards are set to INTA.

Assigning DMA Channels for ISA Cards

Some ISA cards, both Legacy and PNP may also need to use a DMA channel. DMA assignments for the NUPRO-710 are handled the same way as the IRQ assignment process described above. You can select a DMA channel in the PCI and PNP configuration section of the BIOS Setup utility.

IMPORTANT: In BIOS setup, you should choose "YES" for those IRQ' s and DMA' s you wish to reserve for Legacy (Non-PNP) ISA cards, otherwise conflicts may occur.

3

Connectors

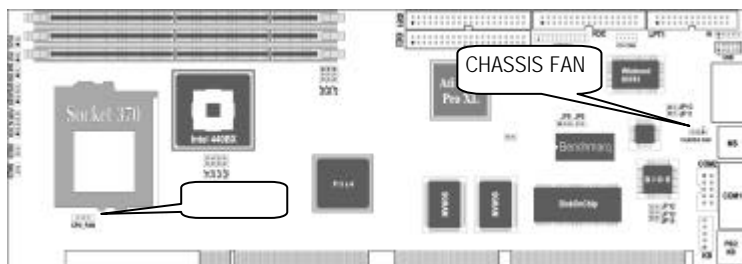
There are several connectors on the board for switches and indicator lights from the system case. The connectors are made of the same components as the jumper switches. There are also connectors for the on board I/O ports and the leads from a 5-volt system power supply.

IMPORTANT: Ribbon cable should always be connected with the red stripe on the Pin 1 side of the connector. The Four Corners of the connectors are labeled on the NUPRO-710. Pin 1 is the side closet to the power connector on hard drivers and floppy drivers. IDE ribbon cable must be less than 18in. (46cm), with the second drive connector no more than 6in. (15cm) From the first connector.

3.1 CPU/CHASSIS FAN Connector

Connector for on board CPU Cooler and chassis +12VDC fan.

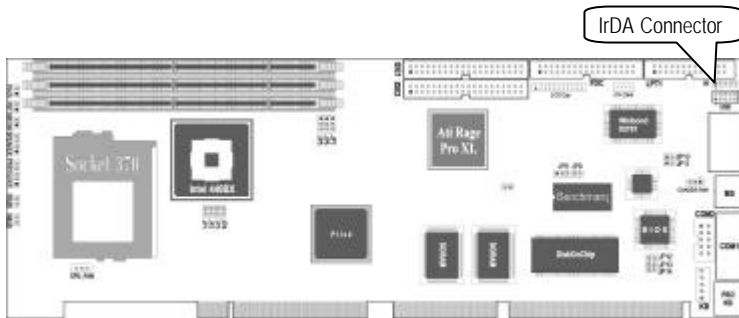
Pin	Function
1	Fan sensor
2	+12V DC
3	GPO#0



3.2 IRCON Connector

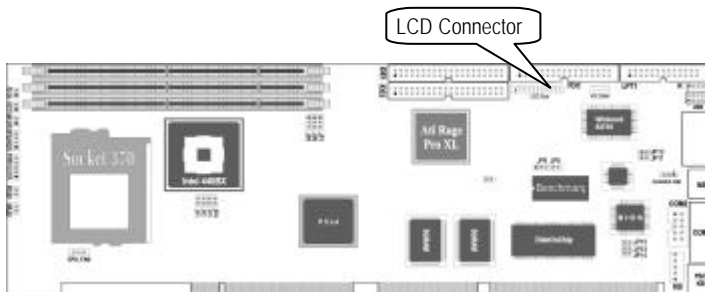
Pin	Function
1	+ 5 V
2	OPEN
3	RIRRX
4	GND
5	RIRTX

Connector for optional IrDA-Compliant infrared port module.

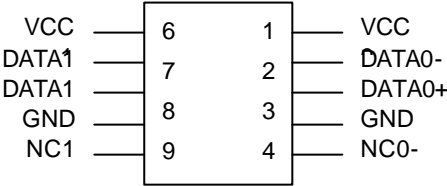
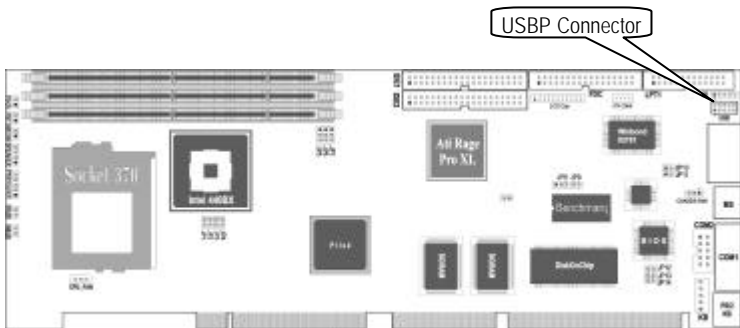


3.3 LCD Connector

DFPCLK	20	10	NC
DFPDAT	19	9	NC
MONDET	18	8	+5V
NC	17	7	GND
TXOM	16	6	TXCM
TXOP	15	5	TXCP
TXVSSR	14	4	TXVSSR
TXVSSR	13	3	TXVSSR
TX2M	12	2	TX1M
TX2P	11	1	TX1P



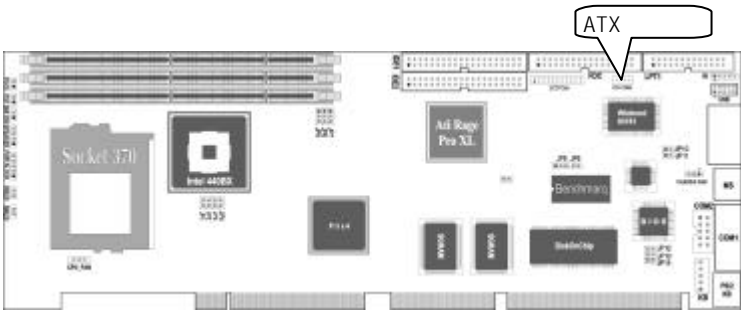
3.4 USBP Connector



3.5 ATX Connector

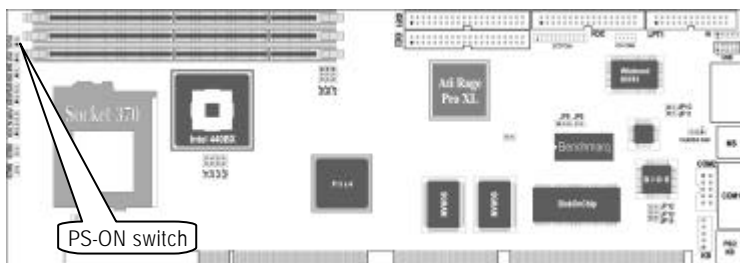
Connector for backplane ATX connector.

Pin	Function
1	NC
2	5V SB
3	PS_ON
4	GND



3.6 PS-ON Switch

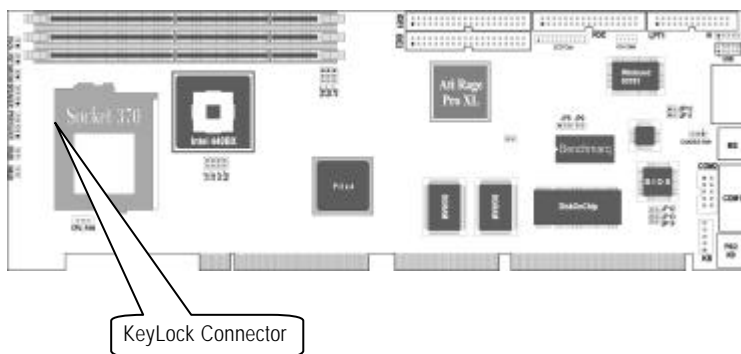
If you use ATX power supply and have connected a 4-pin ATX cable to backplane, the PS-ON switch will be active. A two pin cable connects to the chassis power switch.



The system power is controlled by a momentary switch connected to this lead. Pushing the button once will switch the system between ON and SLEEP. Pushing the switch while in the ON mode will turn the system off.

3.7 KEY Lock Connector

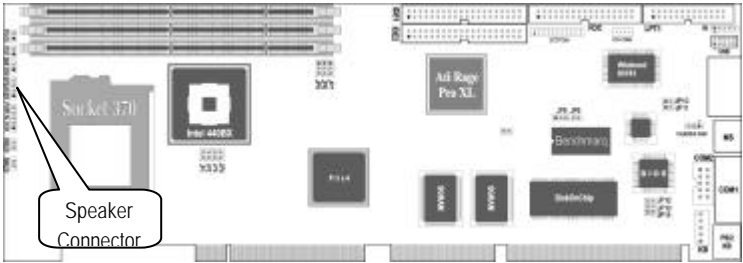
Connector for a keyboard lock.



3.8 Speaker Connector

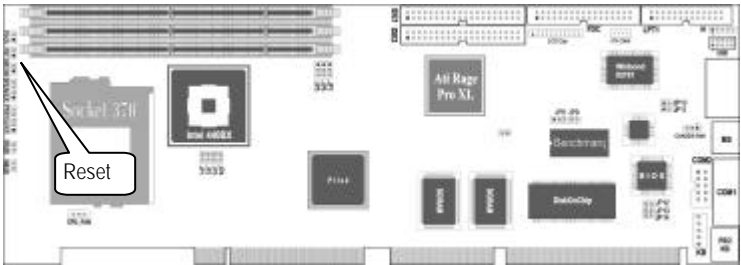
Connector for a system case speaker lead.

Pin	Function
1	Speaker out
2	N.C.
3	Ground
4	+5V



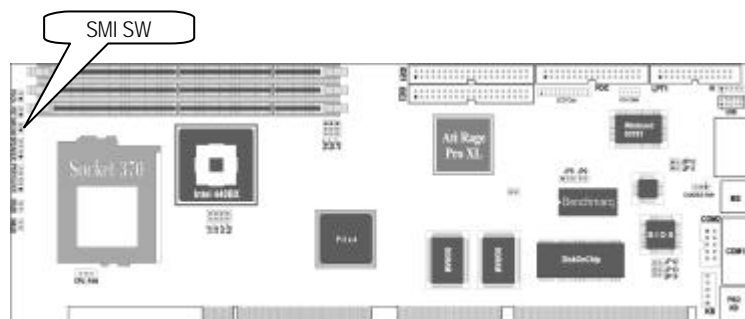
3.9 Reset Switch Connector

Connector for a Reset switch lead.



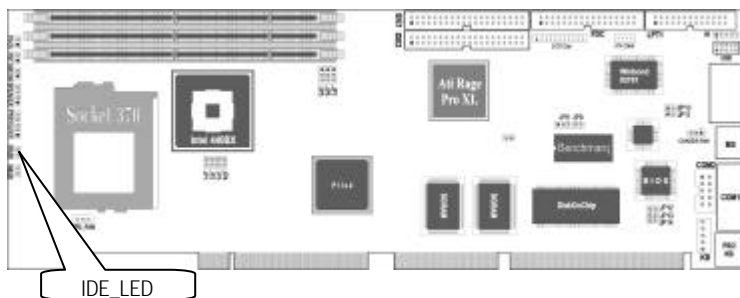
3.12 SMI Switch Connector

Connector for a Suspend switch LED.



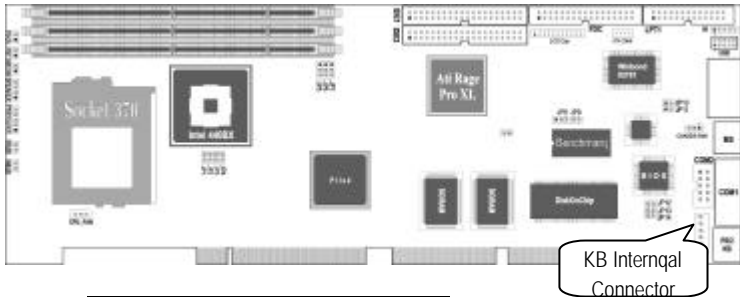
3.13 IDE_LED

Connector for an IDE Activity LED lead.



3.14 Internal KB Connector

Connector for NUPRO-710 to Backplane KB Connector.

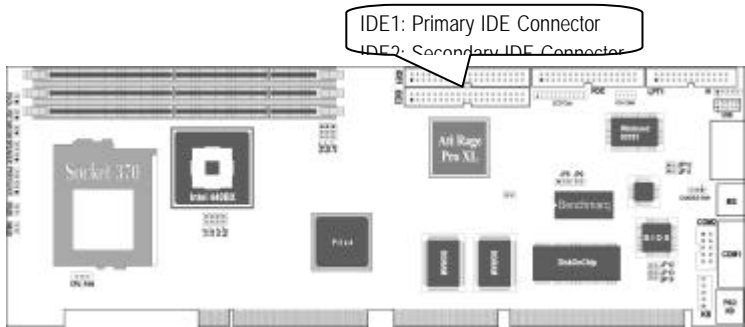


Pin	Function
1	KB Clock
2	KB Data
3	Power Good
4	GND
5	+5V

3.15 Primary, Secondary IDE Connector

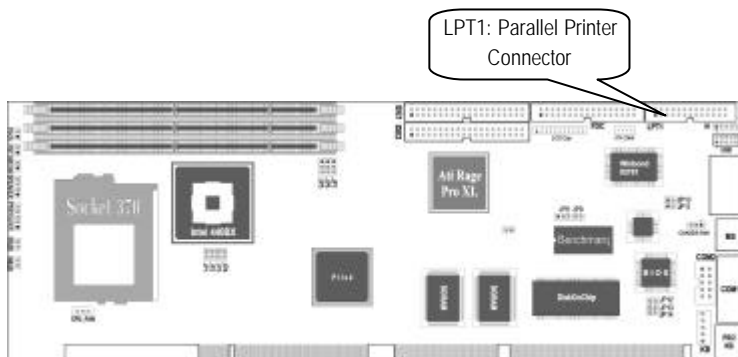
This connector supports the provided IDE hard disk ribbon cable. After connecting the single end to the board. Connect the two plugs at the other end to your hard disk(s). If you installed two hard disks, you must configure the second drive to Slave mode by setting its jumpers accordingly. Please refer to the documentation of your hard disk for the jumpers setting.

You may also configure two hard disk to be both Master using one-ribbon cable on the primary IDE connector and another ribbon cable on the secondary IDE connector.



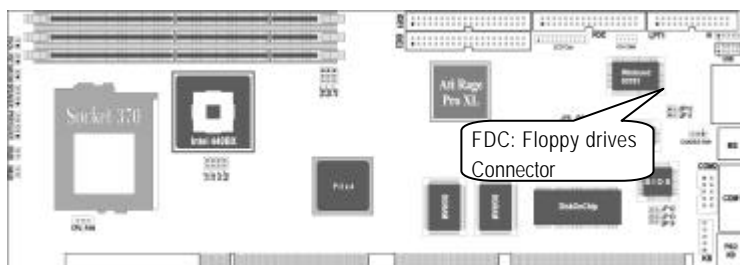
3.16 Parallel Printer Connector

Connection for the included parallel port ribbon cable with mounting bracket. Connect the ribbon cable to this connection and mount the bracket to the case on an open slot. It will then be available for a parallel printer cable.



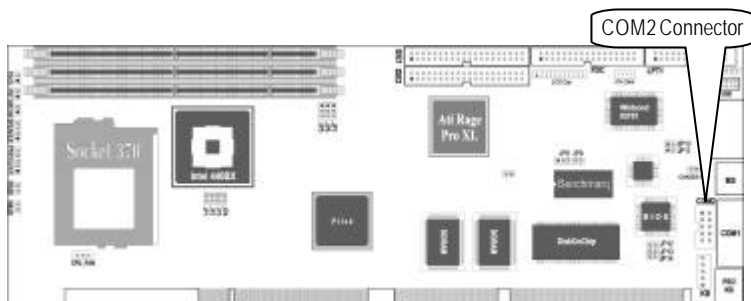
3.17 Floppy drive connector

This connector supports the provided floppy drive ribbon cable. After connecting the single end to the board, connect the two plugs on the other end to the floppy drives.



3.18 COM2 Connectors

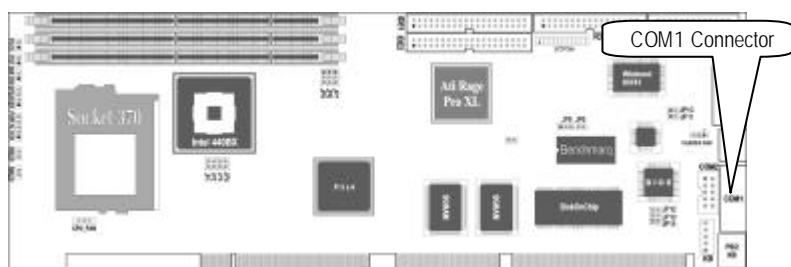
These connectors support the provided serial port ribbon cable with mounting bracket.



NDCOB	1	2	NSINB
NSOUTB	3	4	NDTRB
GND	5	6	NDSRB#
NRTSB	7	8	NCTSB#
NRIB#	9	10	

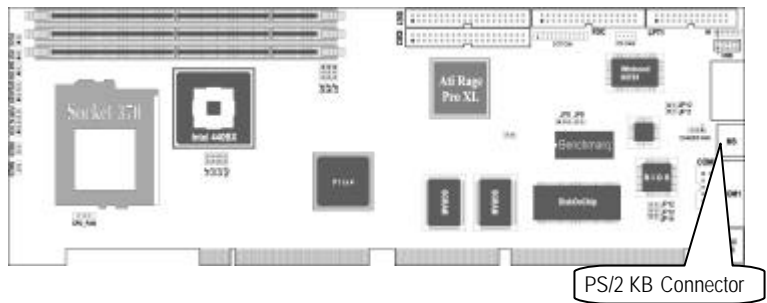
3.19 COM1 Connector (9-pin female)

The COM1 connector is direct to mount on board bracket.



3.20 PS/2 Mouse Connector (6-pin female)

PS/2 Mouse will direct to IRQ12. If not detect, expansion cards can use IRQ12.

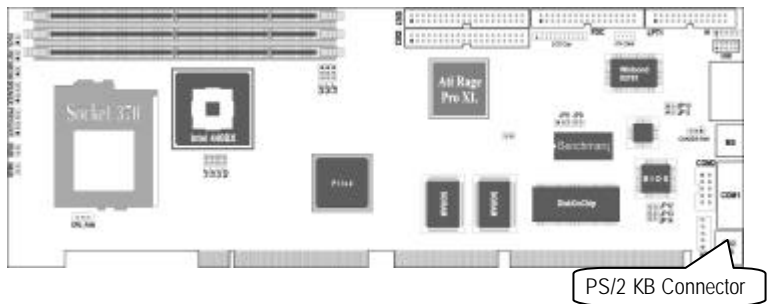


Pin	Function
1	Data
2	NC
3	GND
4	VCC +5V
5	CLK
6	NC



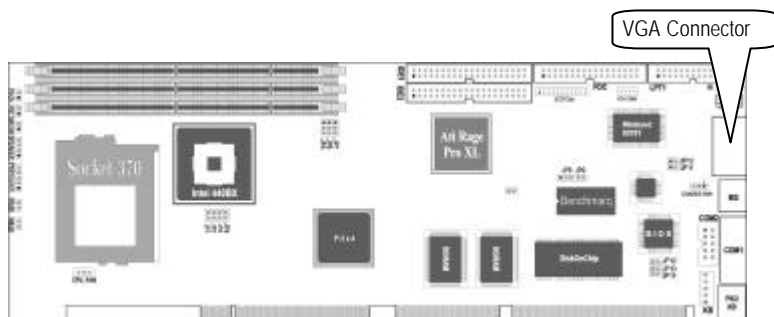
3.21 PS/2 KB Connector (6-pin female)

This connection is for a standard IBM - Compatible Keyboard



3.22 VGA Connector

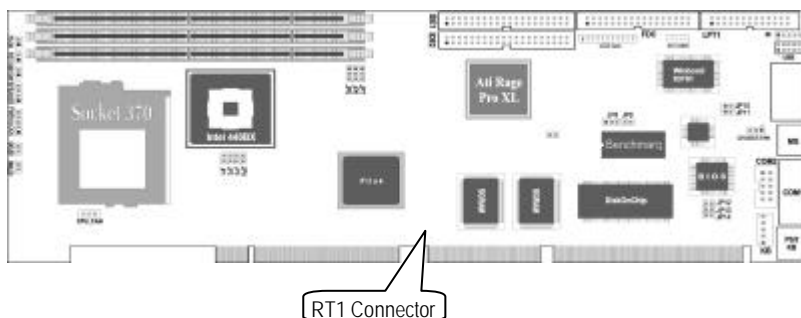
This VGA connection is 15-pin female for a standard Monitor.



3.23 RT1: Hardware Monitoring connector

CPU temperature can be monitored by BIOS or Win95/98/NT4.0, utility program could be found in CD (provided by Winbond).

Plug two pins connector into RT1 and V shape metal into CPU heatsink.



4

BIOS Setup

4.1 UPDATING NUPRO-710 BIOS (Software Flash)


1. Get the AWARD BIOS Updated Diskette (Provided by ADLINK when someday BIOS need to be updated.
2. Turn OFF your computer and Boot from A: (The AWARD BIOS Updated Diskette).
3. FLASH MEMORY WRITER FILES: AWDFLASH.EXE, BIOS data code file: AWD***.ROM (***) means version of BIOS).
4. Type: AWDFLASH at the "A:\" prompt.
5. Fill in BIOS data code: AWD***.ROM.

FLASH MEMORY WRITER V5.34 Copyright (C) 1996, Award Software, Inc.,	
For i440BX-SMC669-2A69KMHB	DATE: 12/30/97
Flash Type – SST 29EE020 /5V	
File Name to Program: xxx.bin	
Error Message: Do You Want To Save Bios (Y/N)	

6. **ERROR Message: Do You Want To Save BIOS (Y/N).**
This option allows you to copy the contents of the Flash memory chip onto a diskette. This gives you a backup copy of the original NUPRO-710 BIOS in case you need to re-install it.

FLASH MEMORY WRITER V5.34 Copyright (C) 1996, Award Software, Inc.,	
For i440BX-SMC669-2A69KMHB	DATE: 12/30/97
Flash Type – SST 29EE020 /5V	
File Name to Program: xxx.bin	
Error Message: Are you sure to program (Y/N)	

7. **ERROR Message: Are You Sure To Program (Y/N).**
Don' t turn off the power until flash process is done.

FLASH MEMORY WRITER V5.34 Copyright (C) 1996, Award Software, Inc.,	
For i440BX-SMC669-2A69KMHB	DATE: 12/30/97
Flash Type – SST 29EE020 /5V	
File Name to Program: AWP2xxx.bin	
Programming Flash Memory – 3FFFF OK	
	
Message: Please Power off or Reset System !	

8. To. Determine the BIOS version, check the last three numbers of the code displayed on the upper left-hand corner of your screen during bootup.

AWARD BIOS Setup

All computer mainboard of this type have a 'Setup' utility program stored in the BIOS ROM that is used to create a record of the system configuration and settings. If you are received your mainboard installed as part of a system, the proper entries have probably already been made. If so, you might want to call up the Setup Utility, as described later, to take a look at them, and perhaps record them for future reference, particularly the hard disk specifications.

If you are installing the board or reconfiguring your system, you will need to enter new setup information. This section explains how to use the program and make the appropriate entries.

The Setup Utility is stored in the BIOS ROM. When you turn the computer on, a screen message appears to give you an opportunity to call up the Setup Utility. It displays during the POST (Power On Self Test). If you do not have a chance to respond, reset the system by simultaneously typing the <Ctrl>, <Alt> and <Delete> key, or by pushing the 'reset' button on the system cabinet. You can also restart by turning the system OFF then ON.

This message will then reappear:

TO ENTER BEFORE BOOT PRESS CTRL-ALT-ESC OR DEL KEY

After you press the key the main program screen will appear, displaying the following choices.

Main Program Screen	
ROM PCI/ISA BIOS (2A69KMHB) CMOS SETUP UTILITY AWARD SOFTWARE, INC.	
STANDARD CMOS SETUP BIOS FEATURES SETUP CHIPSET FEATURES SETUP POWER MANAGEMENT SETUP PNP / PCI CONFIGURATION SETUP LOAD BIOS DEFAULTS LOAD SETUP DEFAULTS	INTEGRATED PERIPHERALS SUPERVISOR PASSWORD USER PASSWORD IDE HDD AUTO DETECTION SAVE & EXIT SETUP EXIT WITHOUT SAVING
Esc : Quit F10 : Save & Exit Setup	↑ ↓ → ← : Select Item (Shift) F2 : Change Color
Time, Date, Hard Disk Type...	

This screen provides access to the utility's various functions.

Note: The 'BIOS Default' are minimized settings for troubleshooting. Use the 'Setup Defaults' to load optimized defaults for regular use. If you choose defaults at this level, modifies all applicable settings.

A section at the bottom of the screen explains the controls for this screen. Use the arrow key to move between items, <Shift> + <F2> to change the color scheme of the display and <Esc> to exit the utility. If you want to save changes, press the <F10> key to save the changes you made and exit the utility. Another section at the bottom of the screen displays a brief explanation of the item highlighted in the list.

4.2 Standard CMOS Setup

"Standard CMOS Setup" records some basic system hardware information and sets the system clock and handling. If your mainboard is already installed in working system you will not need to do this. If the configuration record that is stored in the CMOS memory on the board is lost or corrupted, or if you change your system hardware configuration, you will need to recreate the record. The configuration record can be lost or corrupted if the on-board battery that maintains it weakens or fails.

Standard CMOS Setup Screen

ROM PCI/ISA BIOS (2A69KMHB) STANDARD CMOS SETUP AWARD SOFTWARE, INC.								
Date (mm:dd:yy) : Fri, Apr 7 1995 Time (hh:mm:ss) : 00 : 00 : 00								
HARD DISKS	TYPE	SIZE	CYLS	HEADS	PRECOMP	LANDZ	SECTOR	MODE
Primary Master	: Auto	0	0	0	0	0	0	Auto
Primary Slave	: Auto	0	0	0	0	0	0	Auto
Secondary Master	: Auto	0	0	0	0	0	0	Auto
Secondary Slave	: Auto	0	0	0	0	0	0	Auto
Drive A : 1.44M, 3.5 in.			Base Memory : 640K Extended Memory : 15360K Other Memory : 384K <hr/> Total Memory : 16384K					
Drive B : None								
Video : EGA/VGA								
Halt On : All Errors								
ESC : Quit	↑↓→←		: Select Item		Pu/PD/+/- : Modify			
F1 : Help	(SHIFT) F2		: Change Color					

“STANDARD CMOS SETUP” displays a screen with a list of entries. Follow the on-screen instructions to move around the screen. Instructions at the bottom of the screen list the controls for this screen. Use the arrow keys to move between fields, and the <Page Up> (‘ PU’), <Page Down> (‘ PD’) or plus and minus keys to change the option shown in the selected field. Press <Shift> + <F2> changes the color scheme of the display, and <Esc> exits this level and returns to the main screen.

Modifiable fields appear in a different color. If you need information about what changes to make, press the <F1> key. The help menu will then give you information on the item highlighted. The display of available memory at the lower right-hand side of the screen functions automatically.

Date & Time

The first two lines on the screen are the date and time settings for the system clock.

Hard Drive Type

You must enter the specifications of all non-SCSI hard disk drives installed in your system. MFM, ESDI and IDE hard disk all need to have their specifications recorded here. The onboard PCI IDE connectors provide two channels, Primary and Secondary for connecting up to four IDE hard disks need to be entered here.

If you have one more SCSI hard disks installed in your system, you do not need to enter specifications here. SCSI drives operate using device drivers and are not supported directly by any current PC BIOS. If your mainboard has the SCSI controller card option, and you will use it, see the SCSI instructions that follow later in this section. If you have some other SCSI controller, follow the instructions that came with it on how to install any required SCSI driver.

They are four hard disks listed “Primary Master”, “Primary Slave”, “Secondary Master” and “Secondary Slave”. For each IDE channel, the first device is the ‘ master’ and the second device the ‘ slave’ .

To enter the specifications for an MFM or ESDI hard disk drive, you must first select a ‘ type’ . You can select the “User” option and enter the specifications yourself manually or there are 45 predefined drive specifications, which you can look through to see if the specifications for your drive are assigned a type number. Do this by using the <Page Up> or <Page Down> key to change the option listed after the drive letter.

For an IDE hard drive, you should use the auto-detection utility described later to enter the drive specifications automatically. If you want to do this, leave the drive set to “None”. You can enter the specifications yourself manually by using the user option if you want to.

There are six categories of information you must enter “Cyls “ (number of cylinders,)” Head “ (number of read/write heads,)” Precomp “ (write precompensation,)” LandZ “ (landing zone,)” Sector (number of sectors) and “Mode”. The “Size” entry is automatically determined by the other specifications. Your hard disk vendor’s or system manufacturer’s documentation should provide you with the drive specifications. If you have an IDE drive, unless your drive is already formatted with specifications different from those detected by the auto-detection utility, the easiest thing to do is use the auto-detection feature to enter the drive specifications.

Mode Setting For Hard Disk Drives Larger Than 528MB

The last of the specification entries, Mode, requires additional explanation. The mode settings are for IDE hard disks only. You can ignore this item for MFM and ESDI drives. There are three entries you can select from in the mode field, “Normal”, “Large” and “LBA”.

Set mode to the Normal setting for IDE hard disk drives smaller than 528MB. Use the LBA setting for drives over 528MB that use Logical Block Addressing mode to allow large IDE hard disks. The Large type of drive can only be used with MS-DOS and is uncommon. The majority of IDE drives over 528MB use the LBA mode.

Note: Entering incorrect drive specifications will result in a hard disk drive functioning improperly or not at all.

Floppy Disk Drives

The next two lines record the types of floppy disk drive present. The options for drives A and B are:

- 360KB, 5.25 in.
- 1.2MB, 5.25 in.
- 720KB, 3.5 in.
- 1.44MB, 3.5 in.
- 2.88MB, 3.5 in.
- None
- Highlight the listing after each drive name and select the appropriate entry.

Video Display Types

“Video” refers to the type of video display card your system has.

The options are:

- EGA/VGA
- Mono (for Hercules or MDA)
- CGA 40
- CGA 80

You should select the setting that matches your video display card. If you have a VGA or any higher resolution card, choose the EGA/VGA setting.

Error Handling

The last line “Halt On” controls whether the system stops in case of an error. The options are:

- All Errors
- No Errors
- All, But Keyboard
- All, But Diskette
- All, But Disk/Key

For most purposes, we suggest that you leave the setting on the default, “All Errors”, unless you know why you want to use a different setting.

When you have made your selections, exit to the main program screen by pressing the <Esc> key.

4.3 BIOS Features Setup

“BIOS FEATURES SETUP” is a list of system configuration options. Some entries are default required by the mainboard’s design. Others will improve your system’s performance if enabled, or let you set up some system features according to your preference.

BIOS Features Setup Screen

ROM PCI/ISA BIOS (2A69KMHB) BIOS FEATURES SETUP AWARD SOFTWARE, INC.			
Virus Warning	: Disabled	Video BIOS Shadow	: Enabled
CPU Internal Cache	: Enabled	C8000 -CBFFF Shadow	: Disabled
External Cache	: Enabled	CC000-CFFFF Shadow	: Disabled
Quick Power On Self Test	: Disabled	D0000 -D3FFF Shadow	: Disabled
Boot Sequence	: C, A	D4000 -D7FFF Shadow	: Disabled
Swap Floppy Drive	: Disabled	D8000 -DBFFF Shadow	: Disabled
Boot Up Floppy Seek	: Enabled	DC000-DFFFF Shadow	: Disabled
Boot Up NumLock Status	: On		
Boot Up System Speed	: High		
Gate A20 Option	: Fast		
Memory Parity Check	: Enabled		
Typematic Rate Setting	: Disabled		
Typematic Rate (Chars/Sec)	: 6		
Typematic Delay (Msec)	: 250		
Security Option	: Setup	ESC : Quit	↑↓→← : Select Item
PCI/VGA Palette Snoop	: Disabled	F1 : Help	PU/PD/+/- : Modify
OS Select For DRAM > 64MB	: Non-OS2	F5 : Old Values (SHIFT)	F2 : Color
		F6 : Load BIOS Defaults	
		F7 : Load Setup Defaults	

A section at the lower right of the screen explains how to navigate and make changes. The controls are the same as for the Standard CMOS Setup.

If you need information about what changes to make, highlight an entry and press the <F1> key. A pop-up help menu will display information about the highlighted item. Press the <F5> key to recall the last set of values saved for this page. Pressing the <F6> key loads the BIOS default values for this page and <F7> loads the Setup default values.

The following explains the options for each entry and indicates the default settings (Setup Defaults) for this screen.

Virus Protection

The “Virus Warning” default setting is “Disabled”. This feature protects the boot sector and partition table of your hard disk. Any attempt to write to them will halt the system and cause a warning message to appear. If this

happens, you can either allow the operation to continue or stop it or use anti-virus utility on a virus-free bootable floppy disk to reboot and investigate your system.

Cache Control

The “CPU Internal Cache” and “External Cache” default settings are “Enabled”. These settings enable CPU’s ‘Level 1’ built-in cache and the ‘Level 2’ secondary cache. The BIOS default settings will disable the L2 cache. Leave both enabled unless you are troubleshooting a problem.

Boot Up Features

The “Quick Power On Self Test” default setting is “Enabled”. This speeds up the Power On Self Test (POST) by skipping some items that are normally checked during the full POST. If your system is functioning normally, you can use this feature to speed the boot up process.

The “Boot Sequence” default setting is “C:, A:” the other option is “A:, C:”. The setting determines where the computer looks first for an operating system, the hard disk or the floppy drive.

The “Swap Floppy Drive” default setting is “Disabled”. When enabled, the BIOS will swap floppy drive assignments so that Drive A will function as Drive B: and Drive B: as Drive A: under DOS.

The “Boot Up Floppy Seek” default setting is “Disabled”. When enabled, the BIOS will check if there is a 360KB floppy disk drive installed. Don’t change this unless there is a 360 drive installed.

The default “Boot Up NumLock Status” setting is “On”. When the computer boots, the numbers on the numeric keypad of an IBM-compatible extended keyboard will be active. If you turn this off the keypad cursor controls will be active.

“Boot Up System Speed” sets the CPU speed at boot up. The default setting is “High”.

Gate A20 Option

This entry allows you to select how the gate A20 is handled. The gate A20 is a device used to address memory above 1 Mbytes. Initially, the gate A20 was handled via a pin on the keyboard. Today, while keyboards still provide this support, it is more command, and much faster, for the system chipset to provide support for gate A20.

Normal	Keyboard
Fast	Chipset

Keyboard Interface

The “Typematic Rate Setting” default setting is “Disabled” . If enabled, you can set the Typematic controls that follow.

The “Typematic Rate (Char/Sec)” controls the speed at which the system registers repeated keystrokes. The choices range from 6 to 30 characters per second (default is 6).

The “Typematic Delay (Msec)” controls the time between the display of the first and second characters. There are four delay rate choices: 250ms, 500ms, 750ms, and 1000ms (default is 250ms).

Password Control

The “Security Option” controls the Password Setting in the main screen. The default setting is “System” , uses the User Password feature every time you boot up. The other setting is “Setup” . This will allow the system to boot, and use the Supervisor Password only to protect the Setup Utility settings from being tampered with. You create a password by using the Supervisor or User Password command from the main screen as explained later in this section.

OS Select for DRAM > 64MB

This item allows you to access the memory that over 64MB in OS/2. The choice: Non-OS2, OS2.

PCI/VGA Palette Snoop

It determines whether the MPEG ISA/VESA VGA cards can work with PCI/VGA or not.

Enabled	When PCI/VGA working with MPEG ISA/VESA VGA card.
Disabled	When PCI/VGA not working with MPEG ISA/VESA VGA card.

Shadow Controls

The default setting for the “Video BIOS Shadow” is “Enabled” . This copies the video display card BIOS into system DRAM to improve performance.

The next ten lines, “C8000-CBFFF Shadow” to “EC000-EFFFF Shadow” are for shadowing other expansion card ROMs. The default setting for these areas is “Disabled” . If you have other expansion cards with ROMs on them, you will need to know which addresses the ROMs use to shadow them specifically. When you shadow a ROM it reduces the memory available between 640KB and 1024KB by the amount used for shadowing.

After you have made your selections in BIOS Features Setup, press the <Esc> key to go back to the main screen. The next item is Chipset Features Setup.

4.4 Intel 440BX Chipset Features Setup

ROM PCI/ISA BIOS (2A69KMHB) CHIPSET FEATURES SETUP AWARD SOFTWARE, INC			
Auto Configuration	: Enabled	IN0 (V) : 1.95V	IN1 (V) : 2.51V
EDO DRAM Speed Selection	: 60ns	IN2 (V) : 3.28V	IN3 (V) : 5.26V
EDO CASx# MA Wait State	: 1	IN4 (V) : 12.03V	IN5 (V) : -11.48V
EDO RASx# Wait State	: 1	IN6 (V) : -4.78V	
SDRAM RAS-to-CAS Delay	: 2	Shutdown Temperature	: 60°C/140°F
SDRAM RAS Precharge Time	: 3		
SDRAM CAS latency Time	: 2		
DRAM Data Integrity Mode	: Non-ECC		
System BIOS Cacheable	: Disabled		
Video BIOS Cacheable	: Disabled		
Video RAM Cacheable	: Disabled		
8 Bit I/O Recovery Time	: 1		
16 Bit I/O Recovery Time	: 1		
Memory Hole At 15M-16M	: Disabled		
Passive Release	: Disabled		
Delay Transaction	: Disabled		
AGP Aperture Size (MB)	: 4		
Autodetect DIMM/PCI Clk	: Enabled		
Spread Spectrum	: Disabled		
CPU Host Clock	: 100MHz		
CPU Warning Temperature	: 50°C/122°F	ECS : Quit	↑↓→← : Select Item
Current System Temp.	: 24°C/75°F	F1 : Help	PU/PD/+/- : Modify
Current CPUFAN1 Speed	: 0 RPM	F5 : Old Values (Shift)	F2 : Color
Current CPUFAN2 Speed	: 0 RPM	F6 : Load BIOS Defaults	
Current CPUFAN3 Speed	: 0 RPM	F7 : Load Setup Defaults	

ADVANCED OPTIONS. The parameters in this screen are for system designers, service personnel, and technically competent users only. Do not reset these values unless you understand the consequences of your changes.

NOTE: This chapter describes all fields offered by Award Software in this screen. Your system board designer may omit or modify some fields.

Auto Configuration

Auto Configuration selects predetermined optimal values of chipset parameters. When Disabled, chipset parameters revert to setup information stored in CMOS. Many fields in this screen are not available when Auto Configuration is Enabled.

The Choice: Enabled, Disabled.

EDO DRAM Speed Selection

The DRAM timing is controlled by the DRAM Timing Registers. The timings programmed into this register are dependent on the system design. Slower rates may be required in certain system designs to support loose layouts or slower memory.

50ns	DRAM Timing Type.
60ns	DRAM Timing Type.

EDO CASx# MA Wait State

You could select the timing control type of EDO DRAM CAS MA (memory address bus). The choice: 1, 2.

EDO RASx# Wait State

You could select the timing control type of EDO DRAM RAS MA (memory address bus). The choice: 1, 2.

SDRAM RAS-to-CAS Delay

You can select RAS to CAS Delay time in HCLKs of 2/2 or 3/3. The system board designer should set the values in this field, depending on the DRAM installed. Do not change the values in this field unless you change specifications of the installed DRAM or the installed CPU..

The Choice: 2, 3.

SDRAM RAS Precharge Time

Defines the length of time for Row Address Strobe is allowed to precharge.

The Choice: 2, 3.

SDRAM CAS latency Time

You can select CAS latency time in HCLKs of 2/2 or 3/3. The system board designer should set the values in this field, depending on the DRAM installed. Do not change the values in this field unless you change specifications of the installed DRAM or the installed CPU..

The Choice: 2, 3.

DRAM Data Integrity Mode

Select Parity or ECC (error-correcting code), according to the type of installed DRAM.

The Choice: Non-ECC, ECC.

4.4.1 Cache Features

System BIOS Cacheable

Select Enabled allows caching of the system BIOS ROM at F000h-FFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

Enabled	BIOS access cached
Disabled	BIOS access not cached

Video BIOS Cacheable

Select Enabled allows caching of the video BIOS ROM at C0000h-F7FFFh, resulting in better video performance. However, if any program writes to this memory area, a system error may result.

Enabled	Video BIOS access cached
Disabled	Video BIOS access not cached

Video RAM Cacheable

Select Enabled allows caching of the video RAM, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

4.4.2 PCI and IDE Configuration

8 Bit I/O Recovery Time

The recovery time is the length of time, measured in CPU clocks, which the system will delay after the completion of an input/output request. This delay takes place because the CPU is operating so much faster than the input/output bus that the CPU must be delayed to allow for the completion of the I/O. This item allows you to determine the recovery time allowed for 8 bit I/O.

Choices are from NA, 1 to 8 CPU clocks.

16 Bit I/O Recovery Time

This item allows you to determine the recovery time allowed for 16 bit I/O. Choices are from NA, 1 to 4 CPU clocks.

Memory Hole At 15M-16M

In order to improve performance, certain space in memory can be reserved for ISA cards. This memory must be mapped into the memory space below 16 MB.

Enabled	Memory hole supported.
Disabled	Memory hole not supported.

Passive Release

When Enabled, CPU to PCI bus accesses are allowed during passive release. Otherwise, the arbiter only accepts another PCI master access to local DRAM.

The Choice: Enabled, Disabled.

Delayed Transaction

The chipset has an embedded 32-bit posted write buffer to support delay transactions cycles. Select Enabled to support compliance with PCI specification version 2.1.

The Choice: Enabled, Disabled.

AGP Aperture Size (MB)

Select the size of the Accelerated Graphics Port (AGP) aperture. The aperture is a portion of the PCI memory address range dedicated for graphics memory address space. Host cycles that hit the aperture range are forwarded to the AGP without any translation. See www.agpforum.org for AGP information.

The choice: 4, 8, 16, 32, 64, 128, 256

CPU Host Clock

This option tells clock generator what frequency to send to the CPU, DRAM, and 440BX AGPset. This allows the selection of the CPU's External frequency (or Bus Clock). The Bus Clock multiplied by the Bus Ratio equals the CPU's Internal frequency (the advertised CPU speed).

The choice: 50 to 113MHz.

Current System Temp

This field displays the *current* system temperature, if your computer contains a monitoring system.

Current CPUFAN1/2/3 Speed

These fields display the *current* speed of up to three CPU fans, if your computer contains a monitoring system.

4.5 Power Management Setup

Power Management Setup controls the mainboard' s “green” features. The features shut down the video display and hard disk to save energy.

The Power Management Setup Screen

ROM PCI/ISA BIOS (2A69KMHB) POWER MANAGEMENT SETUP AWARD SOFTWARE, INC.		
ACPI function	: Enabled	** Reload Global Timer Events ** IRQ[3 - 7, 9 - 15], NMI : Disabled Primary IDE 0 : Disabled Primary IDE 1 : Disabled Secondary IDE 0 : Disabled Secondary IDE 1 : Disabled Floppy Disk : Disabled Serial Port : Disabled Parallel Port : Disabled
Power Management	: Disabled	
PM Control by APM	: Yes	
Video Off Method	: V/H SYNC+Blank	
Video Off After	: NA	
MODEM Use IRQ	: NA	
Doze Mode	: Disabled	
Standby Mode	: Disabled	
Suspend Mode	: Disabled	
HDD Power Down	: Disabled	
Throttle Duty Cycle	: 12.5%	ESC : Quit ↑↓→←: Select Item F1 : Help PU/PD/+/- : Modify F5 : Old Values (SHIFT) F2 : Color F6 : Load BIOS Defaults F7 : Load Setup Defaults
ZZ Active in Suspend	: Disabled	
PCI/VGA Act-Monitor	: Disabled	
Soft -Off by PWR-BTTN	: Instant-Off	
CPU FAN Off In Suspend	: Enabled	
Resume by Ring	: Disabled	
IRQ 8 Break Suspend	: Disabled	

This category allows you to select the type (or degree) of power saving and is directly related to the following modes:

- 1. Doze Mode
- 2. Standby Mode
- 3. Suspend Mode
- 4. HDD Power Down

There are four selections for Power Management, three of which have fixed mode settings.

Disable (default)	No power management. Disables all four modes
Min. Power Saving	Minimum power management. Doze Mode = 1 hr. Standby Mode = 1 hr., Suspend Mode = 1hr., and HDD Power Down = 15 min.
Max. Power Saving	Maximum power management - ONLY AVAILABLE FOR SL CPU. Doze Mode = 1 min., Standby Mode = 1 min., Suspend Mode = 1 min., and HDD Power Down = 1 min.
User Defined	Allows you to set each mode individually. When not disabled, each of the ranges are from 1 min. to 1 hr, except for HDD Power Down which ranges from 1 min. to 15 min. and disable.

PM Control APM

When enabled, an Advanced Power Management device will be activated to enhance the Max. Power Saving is not enabled, this will be preset to No.

Video Off Method

This determines the manner in which the monitor is blanked.

V/H SYNC+Blank	This selection will cause the system to turn off the vertical and horizontal synchronization ports and writes blanks to the video buffer.
Blank Screen	This option only writes blanks to the video buffer
DPMS	Initial display power management signaling

Video Off After

When enabled, this feature allows the VGA adapter to operate in a power saving mode.

N/A	Monitor will remain on during power saving modes.
Suspend	Monitor blanked when the systems enters the Suspend mode.
Standby	Monitor blanked when the system enters Standby mode.
Doze	Monitor blanked when the system enters any power saving mode.

MODEM Use IRQ

Name the interrupt request (IRQ) line assigned to the modem (if any) on your system. Activity of the selected IRQ always awakens the system.

The choices: NA, 3, 4, 5, 7, 9, 10, 11

4.5.1 PM Timers

The following four modes are Green PC power saving functions which are only user configurable when *User Defined* Power Management has been selected. See above for available selections.

Doze Mode

When enabled and after the set time of system inactivity, the CPU clock will run at slower speed while all other devices still operate at full speed.

Standby Mode

When enabled and after the set time of system inactivity, the fixed disk drive and the video would be off while all other devices still operate at full speed.

Suspend Mode

When enabled and after the set time of system inactivity, all devices except the CPU will be shut off.

HDD Power Down

When enabled and after the set time of system inactivity, the hard disk drive will be powered down while all other devices remain active.

Throttle Duty Cycle

When the system enters Doze mode, the CPU clock runs only part of the time. You may select the percent of time that the clock runs.

The Choice: 12.5%, 25.0%, 37.5%, 50.0%, 62.5%, 75.0%

ZZ Active in Suspend

When Enabled, the ZZ signal is active during Suspend mode.

The Choice: Enabled, Disabled.

PCI/VGA Act-Monitor

When Enabled, any video activity restarts the global timer for Standby mode.

The Choice: Enabled, Disabled.

Soft-Off by PWR-BTTN

When Enabled, turning the system off with the on/off button places the system in a very low-power-usage state, with only enough circuitry receiving power to detect power button activity or Resume by Ring activity.

The Choice: Instant-Off, Delay 4 Sec.

Resume by Ring

An input signal on the serial Ring Indicator (RI) line (in other words, an incoming call on the modem) awakens the system from a soft off state..

The Choice: Enabled, Disabled.

IRQ 8 Break Suspend

You can Enable or Disable monitoring of IRQ8 so it does not awaken the system from Suspend mode. The Choice: Enabled, Disabled.

4.5.2 **Reload Global Timer Events**

When Enabled, an event occurring on each device listed below restarts the global time for Standby mode.

- IRQ[3 -7, 9-15], NMI
- Primary IDE 0
- Primary IDE 1
- Secondary IDE 0
- Secondary IDE 1
- Floppy Disk
- Serial Port
- Parallel Port

4.6 **Intel 440BX PnP/PCI Configuration Setup**

This section describes configuring the PCI bus system. PCI, or **P**ersonal **C**omputer **I**nterconnect, is a system which allows I/O devices to operate at speeds nearing the speed the CPU itself uses when communicating with its own special components. This section covers some very technical items and it is strongly recommended that only experienced users should make any changes to the default settings.

ROM PCI/ISA BIOS (2A69KMHB) PNP/PCI CONFIGURATION AWARD SOFTWARE, INC.			
PNP OS Installed	: Yes	Used MEM Base addr	: D400
Resources Controlled By	: Manual	Used MEM Length	: 16K
Reset Configuration Data	: Disabled		
IRQ-3 assigned to	: Legacy ISA		
IRQ-4 assigned to	: Legacy ISA		
IRQ-5 assigned to	: PCI/ISA PnP		
IRQ-7 assigned to	: Legacy ISA		
IRQ-9 assigned to	: PCI/ISA PnP		
IRQ-10 assigned to	: PCI/ISA PnP		
IRQ-11 assigned to	: PCI/ISA PnP		
IRQ-12 assigned to	: PCI/ISA PnP		
IRQ-14 assigned to	: Legacy ISA		
IRQ-15 assigned to	: Legacy ISA		
DMA-0 assigned to	: PCI/ISA PnP		
DMA-1 assigned to	: PCI/ISA PnP		
DMA-3 assigned to	: PCI/ISA PnP		
DMA-5 assigned to	: PCI/ISA PnP		
DMA-6 assigned to	: PCI/ISA PnP		
DMA-7 assigned to	: PCI/ISA PnP		
		ESC : Quit	↑↓→← : Select Item
		F1 : Help	PU/PD/+/- : Modify
		F5 : Old Values	(SHIFT) F2 : Color
		F6 : Load BIOS Defaults	
		F7 : Load Setup Defaults	

PNP OS Installed

Select Yes if the system operating environment is Plug-and-Play aware (e.g., Windows 95).

The Choice: Yes and No.

Resource Controlled by

The Award Plug and Play BIOS can automatically configure all the boot and Plug and Play-compatible devices. If you select Auto, all the interrupt request (IRQ) and DMA assignment fields disappear, as the BIOS automatically assigns them.

Choices are Auto and Manual (default).

Reset Configuration Data

Normally, you leave this field Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the operating system cannot boot.

Choices are Enabled and Disabled (default).

IRQ n Assigned to

When resources are controlled manually, assign each system interrupt as one of the following types, depending on the type of device using the interrupt:

Legacy ISA Devices compliant with the original PC AT bus specification, requiring a specific interrupt (such as IRQ4 for serial port 1).

PCI/ISA PnP Devices compliant with the Plug and Play standard, whether designed for PCI or ISA bus architecture.

DMA n Assigned to

When resources are controlled manually, assign each DMA channel as one of the following types, depending on the type of device using the interrupt:

Legacy ISA Devices compliant with the original PC AT bus specification, requiring a specific DMA channel.

PCI/ISA PnP Devices compliant with the Plug and Play standard, whether designed for PCI or ISA bus architecture.

Used MEM base addr

Select a base address for the memory area used by any peripheral that requires high memory.

The Choice: C800, CC00, D000, D400, D800, DC00, N/A.

Used MEM Length

Select a length for the memory area specified in the previous field. This field does not appear if no base address is specified.

The Choice: 8K, 16K, 32K, 64K.

4.7 Load BIOS Defaults

“Load BIOS SEFAULTS” loads the troubleshooting default values permanently recorded in the BIOS ROM. These settings are non-optimal and turn off all high performance features.

The Standard CMOS Setup screen is not affected. To use this feature, highlight it on the main screen and press <Enter>. A line will appear asking if you want to load the BIOS default values. Press the <Y> key and then <Enter>. The default settings will load. Press <N> if you don't want to proceed.

Load BIOS Defaults Screen

ROM PCI/ISA BIOS (2A69KMHB) CMOS SETUP UTILITY AWARD SOFTWARE, INC.	
STANDARD CMOS SETUP BIOS FEATURES SETUP CHIPSET FEATURES SETUP POWER MANAGEMENT SETUP PNP/PCI CONFIGUR LOAD BIOS DEFAULT LOAD SETUP DEFAULT	INTEGRATED PERIPHERALS SUPERVISOR PASSWORD USER PASSWORD IDE HDD AUTO DETECTION <div>Load BIOS Defaults (Y/N) ? N</div>
ESC : Quit F10 : Saving & Exit Setup	
↑ ↓ → ← : Select Item (SHIFT) F2 : Change Color	
Load BIOS Defaults except Standard CMOS SETUP	

4.8 Load Setup Defaults

The “**LOAD SETUP DEFAULTS**” option loads optimized settings from the BIOS ROM. Use this option to default settings for normal use.

The Setup Default settings do not affect the Standard CMOS Setup screen. To use the Setup Defaults, Highlight the entry on the main screen and press <Enter>. A line will appear asking if you want to load the Setup default values. Press the <Y> key and then press <Enter>. The Setup Defaults will load. Press <N> if you don’ t want to proceed.

Load Setup Defaults Screen

ROM PCI/ISA BIOS (2A69KMHB) CMOS SETUP UTILITY AWARD SOFTWARE, INC.	
STANDARD CMOS SETUP BIOS FEATURES SETUP CHIPSET FEATURES SETUP POWER MANAGEMENT SETUP PNP/PCI CONFIGUR LOAD BIOS DEFAULT LOAD SETUP DEFAULT	INTEGRATED PERIPHERALS SUPERVISOR PASSWORD USER PASSWORD IDE HDD AUTO DETECTION <div>Load Setup Defaults (Y/N) ? N</div>
ESC : Quit F10 : Saving & Exit Setup	↑↓→← : Select Item (SHIFT) F2 : Change Color
Load SETUP Defaults except Standard CMOS SETUP	

4.9 Integrated Peripherals

ROM PCI/ISA BIOS (2A69KMHB) INTEGRATED PERIPHERALS AWARD SOFTWARE, INC.			
IDE HDD Block Mode	: Enabled	IR Transmittion delay	: Enabled
IDE Primary Master PIO	: Auto	On board Parallel Port	: 378/IRQ7
IDE Primary Slave PIO	: Auto	Parallel Port Mode	: ECP + EPP
IDE Secondary Master PIO	: Auto	ECP Mode Use DMA	: 1
IDE Secondary Slave PIO	: Auto	EPP Mode Select	: EPP 1.7
IDE Primary Master UDMA	: Disabled		
IDE Primary Slave UDMA	: Disabled		
IDE Secondary Master UDMA	: Disabled		
IDE Secondary Slave UDMA	: Disabled		
On-Chip Primary PCI IDE	: Enabled		
On-Chip Secondary PCI IDE	: Enabled		
USB Keyboard Support	: Disabled		
Init Display First	: PCI Slot		
KBC input clock	: 8MHz		
On board FDC Controller	: Enabled	ESC : Quit	↑↓←→ : Select Item
On board Serial Port 1	: 2F8/IRQ3	F1 : Help	PU/PD/+/- : Modify
On board Serial Port 2	: 3F8/IRQ4	F5 : Old Values (SHIFT)	F2 : Color
UART Mode Select	: IrDA	F6 : Load BIOS Defaults	
RxD , TxD Active	: Hi, Hi	F7 : Load Setup Defaults	

IDE HDD Block Mode

This allows your hard disk controller to use the fast block mode to transfer data to and from your hard disk drive (HDD).

Enabled	IDE controller uses block mode.
Disabled	IDE controller uses standard mode.

Enabled is the default.

IDE Primary/Secondary Master/Slave PIO

The four IDE PIO (Programmed Input/Output) fields let you set a PIO mode (0-4) for each of the four IDE devices that the onboard IDE interface supports. Modes 0 through 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device.

IDE Primary/Secondary Master/Slave UDMA

Ultra DMA/33 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Windows 95 OSR2 or a third-party IDE bus master driver). If your hard drive and your system software both support Ultra DMA/33, select Auto to enable BIOS support.

The Choice: Auto, Disabled

On-Chip Primary/Secondary PCI IDE

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select Enabled to activate each channel separately.

USB Keyboard support

Select Enabled if your system contains a Universal Serial Bus (USB) controller and you have a USB keyboard.

The Choice: Enabled, Disabled.

Onboard FDC Controller

Select Enabled if your system has a floppy disk controller (FDC) installed on the system board and you wish to use it. Even when so equipped, if you add a higher performance controller, you will need to disable this feature.

Choices: Enabled, Disabled.

Onboard Serial Port 1/Port 2

This item allows you to determine access onboard serial port 1/port 2 controller with which I/O address.

The Choice: 3F8/IRQ4, 2F8/IRQ3, 3E8/IRQ4, 2F8/IRQ3, Disabled, Auto.

Onboard UART1/UART2

This item allows you to determine access onboard serial port 1/port2 controller with which I/O address.

Choices are 3F8/IRQ4, 238/IRQ3, 3E8/IRQ4, 2F8/IRQ3, Disabled.

UART 2 Mode

This item allows you to determine which InfraRed (IR) function of onboard I/O chip.

Choices are Standard, ASKIR, HPSIR.

RxD, TxD Active

This item allows you to determine the active of RxD, TxD.

The Choice: "Hi, Hi", "Lo, Lo", "Lo, Hi", "Hi, Lo".

Onboard Parallel Port

This item allows you to determine access onboard parallel port controller with which I/O addresses.

Choices are 378/IRQ7, 278/IRQ5, 3BCH/IRQ7, Disabled.

Parallel Port Mode

Select an operating mode for the onboard parallel (printer) port. Normal EPP (Extended Parallel Port) ECP (Extended Capabilities Port) CEP +EPP PC AT parallel port Bi-directional port Fast, buffered port Fast, buffered, bi-directional port.

Select Normal unless you are certain your hardware and software both support EPP or ECP mode.

Choices are SPP, ECP+EPP1.7, EPP1.7+SPP, EPP1.9+SPP, ECP, ECP+EPP1.9, and Normal.

ECP Mode Use DMA

Select a DMA channel for the parallel port for use during ECP mode.

Choices are 3, 1.

Parallel Port EPP Type

This item allows you to determine the IR transfer mode of onboard I/O chip.

Choices are EPP1.9, EPP1.7.

4.11 IDE HDD Auto Detection

If your system has an IDE hard drive, you can use this utility to detect its parameters and enter them into the Standard CMOS Setup automatically.

This utility will detect as many as four IDE drives if your system configuration supports that many. In sequence, a set of parameters for each drive will appear in the box. To accept the entries displayed press the Y key, to skip to the next drive, press the N key. If you accept the values, the parameters will appear listed beside the drive letter and the program will attempt to detect parameters for the next drive. If you press the N key to skip rather than accept a set of parameters, zeros are entered after that drive letter.

Remember, if you use another IDE controller that does not have Enhanced IDE supports for four devices, you can only install two IDE hard disk drives. Your IDE controller must support Enhanced IDE features in order to use Drive E: and Drive F:. The onboard PCI IDE controller supports Enhanced IDE and has two Connectors that support a total of four IDE devices.

When you are finished, any entries you accepted are automatically entered on the line for that drive in the Standard CMOS Setup. Any in Standard CMOS Setup.

Note: If you are setting up a hard disk that supports LBA mode, three lines will appear in the parameter box. Choose the line that lists LBA for an LBA drive. Do not choose Large or Normal.

IDE HDD Auto Detection Screen

ROM PCI/ISA BIOS
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

HARD DISKS

TYPE

SIZE

CYLS

HEADS

PRECOMP

LANDZ

SECTOR

MODE

Primary Master:

Select Primary Master Option (N=Skip) ? N

OPTIONS	SIZE	CYLS	HEADS	PRECOMP	LANDZONE	SECTORS	MODE
2(Y)	1622	786	64	0	3144	63	LBA
1	1623	3145	16	65535	3144	63	NORMAL
3	1622	1572	32	65535	3144	63	LARGE

NOTE: Some OSes (like SCO-UNIX) must run "NORMAL" for installation

ESC: Skip

Important!: This utility will only detect one set of parameters for an IDE hard drive. Some IDE drives can use more than one set. This is not a problem if the drive is new and there is nothing on it . If the hard disk drive is already fully formatted when you install it and different parameters than those detected here were used, you will have to enter them manually.

If the parameters listed don' t match the ones used when the drive was formatted, the drive won' t be readable. If the auto-detected parameters displayed do not match the ones that should be used for your drive, do not accept them. Press the <N> key to reject the values and enter the correct ones manually from the Standard CMOS Setup screen.

4.13 Save and Exit Setup

The next selection on the Utilities menu is "SAVE AND EXIT SETUP" . If you select this and press the <Enter> key the values entered during the current session will be recorded in the CMOS memory on the mainboard. The system will check it every time you turn your system on and compare it to what it finds as it checks the system. This record is required for the system to operate.

Exit Without Saving

The last selection on the main screen is "EXIT WITHOUT SAVING" . Selecting this option and pressing the <Enter> key lets you exit the Setup Utility without recording any new values or changing old ones. If you want to save a new configuration, do not use this option. If you use it, any new setting information will be lost.

You can now use your system without further reference to this utility unless you change the hardware configuration. Remember, if the system configuration information stored in CMOS memory gets corrupted, you will have to reenter it.

5

ATI 3D RagePro XL Features

5.1 General Features

The Rage Pro XL graphics controller is ATI first to support Desktop Digital Flat Panel Monitors. Listed below are the VGA&LCD enhanced features of NUPRO-710:

- High integration results in a low cost, small footprint graphics subsystem ideal.
- Comprehensive AGP support, including 2X mode, Sideband Addressing and AGP Texturing .
- PCI version 2.1 with full bus mastering and scatter / gather support.
- Fully PC 98 compliant.
- Bi-endian support for compliance on a variety of processor platforms.
- Fast response to host commands:
- Programmable flat or paged memory model with linear frame buffer access
- Triple 8-bit palette DAC with gamma correction for true WYSIWYG color. Pixel rates up to 230MHz.
- Supports 2MB to 8MB SGRAM at up to 125MHz providing bandwidths of up to 1Gbyte/sec across a 64-bit interface. Memory upgrade via industry standard SO-DIMM, for reduced board area and higher memory speeds.
- Supports 8MB SDRAM at up to 150MHz across 64-bit interface.
- DDC1/2B+ for plug and play Monitor Supported
- Power management for full VESA DPMS and EPA Energy Star compliance.
- Integrated hardware diagnostic tests performed automatically upon initialization.

- High quality components through built-in SCAN, Iddq, CRC and chip diagnostics.
- Single chip solution in 0.25 μ m, 2.5V CMOS technology, with multiple package options.
- Comprehensive HDKs, SDKs and utilities augmented by full engineering support.

5.2 Integrated TMDS

- Integrated TMDS encoder complying to VESA Plug-and-Display (P & D) digital transmission standard.
- TMDS support for both direct-coupling and capacitor-coupling.

5.3 Digital Flat Panel Monitor Support

- Integrated TMDS transmitters.
- Glueless support for industry Digital Flat Panel Monitor(20 pin MDR)
- Support for TFT panels at resolutions up to 1280 x 1024
- DDC and Hot Plug support for digital flat panels
- Radiometric expansion with horizontal and vertical filtering to best fit panel size.

5.4 LCD Panel Control

- Monitor detection through hot plugging support.
- Flat Panel Power Management.
 - Programmable internal timer for automatic power down of the panel.
 - Standby/Suspend registers for software Power Management support.
- Power Up/Down Sequencer.
- Power up/down sequencer built in to power up and power down the LCD panel in the correct sequence to avoid damaging of the panel. The delays in the power up/down sequence are programmable.
- Flat Panel support. Universal panel interface that supports the followings:
 - Color TFT panel up to 1280 x 1024 resolution, up to 24-bit pixel, single pixel per clock.
 - 2/4 levels of frame modulation can be done on 18-bit TFT panels.
 - Hardware Z-buffer support with TFT panels.

- DDC support for LCD monitors. Dedicated I/O pins are available to support DDC on LCD monitor applications.
- Ratiometric Expansion in both VGA Graphics Modes and Accelerated Graphics Modes. Display modes with resolutions lower than the LCD panel resolution can be 2 tap horizontal and vertical filtering to improve both text and graphics image quality Maximum source resolution support with vertical filtering:
 - Horizontal: 1024 24 bbb.
 - Vertical: no limit: There is NO limit on source resolution if the vertical filtering is disabled.
- Variable Blink Rate Support
- Different panels have different response time. Variable blink rate support allows the blinking character/cursor to be seen clearly.
- Backlight Modulation
 - Pulse Width Modulation (up to 256 levels) for backlight on/off signal to control the brightness of the display.

5.5 ACPI Power Management

- Advanced Configuration and Power Interface (ACPI) with On, Standby, Suspend, and Off.
- Register and Timer modes for hardware and software power management.
- Dynamic clock switching.

5.6 AGP 2X mode

- The AGP 2X mode (133MHz) offers a peak bandwidth in excess of 500MB/s, which is twice the throughput of the AGP 1X(66MHz) mode. The PCI graphics devices are limited to a 33MB/s bandwidth which must be shared with other PCI devices.

5.7 Floating-Point Set-up Engine

- The RAGE PRO XL integrates a floating-point set-up engine capable of processing up to 1.2 million triangles per second. By off-loading the set-up function from the CPU, allowing it to focus on 3D geometry and lighting transformations, the RAGE PRO XL dramatically improves the performance of the entire 3D pipeline.
- Compared with competing first generation set-up engines which only accept fixed-point parameters, requiring the CPU to perform float-to-fixed conversions that can take up to 100 CPU clocks, ATI's floating point architecture opens the door to the highest level of 3D performance.

5.8 125MHz SGRAM

- Frame buffer bandwidth is another important factor affecting 3D and 2D graphics performance. RAGEPRO XL 64-bit, 125MHz SGRAM interface delivers 1GB/s of low-latency frame buffer bandwidth.
- It is the ideal complement to the high bandwidth AGP 2X mode interface. By contrast, single-channel, non-concurrent RAMBUS designs used by others are limited to 600MB/s of high-latency bandwidth.

5.9 2D Acceleration

- Hardware acceleration of BitBlt, Line Draw, Polygon / Rectangle Fill, Bit Masking, Monochrome Expansion, Panning/ Scrolling, Scissoring, full ROP support and h/w cursor (up to 64 x 64 x 2)
- Game acceleration including support for Microsoft's DirectDraw: Double Buffering, Virtual Sprites, Transparent Blit, Masked Blit and Context Chaining.
- Acceleration in 8/16/24/32 bpp modes.
- 2D Display Modes & Refresh rates:

SGRAM						
Resolution	256 colors		65k colors		16.7M colors	
	2MB	2MB	4MB	2MB	4MB	8MB
640 x 480	200	200	200	200	200	200
800 x 600	200	200	200	200	200	200
1024 x 768	150	150	150		150	150
1152 x 864	120	120	120		120	120
1280 x 1024	100		100		100	100
1600 x 1200	85		85			75

* Base on 230 MHz internal DAC in RAGE PRO XL.

5.10 3D Acceleration

- Integrated 1 million triangle/s set-up engine reduces CPU and bus bandwidth requirements and dramatically improves performance of small 3D primitives.
- 4KB on-chip texture cache dramatically improves large triangle performance.
- Complete 3D primitive support: points, lines, triangles, lists, strips and quadrilaterals and BLTs with Z compare.
- Comprehensive enhance 3D feature set:
 - Full screen or window double buffering for smooth animation
 - Hidden surface removal via 16-bit Z-buffer
 - Edge anti-aliasing
 - Sub-pixel and sub-textel accuracy

- Gouraud and specular shaded polygons
- Perspectively correct mip-mapped texturing with chroma-key support
- Supports single pass bi- & tri-linear texture filtering, for vastly improved bi- and tri-linear performance.
- Full support of Direct3D texture lighting
- Texture compositing
- Special effects such as complete alpha blending, fog video textures, texture lighting, reflections, shadows, spotlights, Level of Detail (LOD) biasing and texture morphing
- Dithering support in 16bpp for near 24bpp quality in less memory
- Texture compression of up to 8:1 using vector quantization (VQ)
- Extensive 3D mode support:
 - Draw in RGBA32, RGBA16 & RGB16
 - Texture map modes: RGBA 32, RGBA16, RGB16, RGB8, ARGB4444, YUV444
 - Compressed texture modes: YUV422, CLUT4 (CI4), CLUT8 (CI8), VQ
- 3D display modes:

3D DISPLAY MODES								
Frame Buffer MB	Screen Resolution Pixels x Pixels	Colors Depth (Bits Per Pixel)	Front Buffer MB	Back Buffer MB	Z Buffer MB	Texture Memory		Primary use of configuration
						W Z MB	W/O Z MB	
2	512 x 384	16	0.38	0.38	0.38	0.88	1.25	Volume High-end
2	640 x 480	16	0.59	0.59	0.59	0.24	0.83	
4	640 x 480	16	0.59	0.59	0.59	2.24	2.83	Power Gamers Power Users
4	640 x 480	32	1.17	1.17	0.59	1.07	1.66	
4	800 x 600	16	0.92	0.92	0.92	1.25	2.17	
8	1024 x 768	32	3.00	3.00	1.50	0.5	2.00	Volume CAD
8	1280 x 1024	16	2.50	2.50	2.50	0.5	3.00	

5.11 Motion Video Acceleration

- Hardware DVD decode via integrated motion compensation and IDCT circuitry for full frame rate DVD playback.
- Smooth video scaling and enhanced YUV to RGB color space conversion for full-screen / full-speed video playback.
- Front and back end scalers support multi-stream video for video conferencing and other applications.
- 4-tap horizontal/2-tap vertical filtered upscaling and filtered downscaling enhance playback quality.
- Support for hardware DVD subpicture decoder.
- YUV direct interface to RAGE THEATER without requiring data to be converted to RGB.
- Enhanced line buffer allows vertical filtering of native MPEG-2 size (720x480) images.
- Special filter circuitry eliminates video artifacts caused by displaying interlaced video on non-interlaced displays.
- Bi-directional bus mastering engine with full YUV planar mode support for superior MPEG-2 and video conferencing.
- Hardware mirroring for flipping video images in video conferencing system.
- Supports graphics and video keying for effective overlay of video and graphics.
- YUV to RGB color space converter with support for both packed and planar YUV:
 - YUV422, YUV410, YUV420;
 - RGB32, RGB16/15.

5.12 Software Features

- Register-compatible with VGA standards, BIOS-compatible with VESA Super VGA.
- Full-featured, yet simple Windows utilities:
 - ATI DeskTop supports panning and scrolling across a virtual workspace
 - Calibration utility for WYSIWYG color
- Drivers meet Microsoft's rigorous WHQL criteria and are suitable for systems which bear the "Designed for Windows™NT and Windows™98" logo.
- Software supports:

SOFTWARE SUPPORT									
	DOS	WIN 3.x	WIN 95	WIN 98	NT 3.51	NT 4.0	NT 5.0	Mac OS	OS/2
2D Software Support^①									
Accelerated driver support	VESA ^②	✓	✓	✓	✓	✓	✓	⑦	✓
AutoCAD / MicroStation	✓								
Video Software Support									
Microsoft DirectDraw			✓	✓		✓	✓		
Microsoft ActiveMovie/DirectShow			✓	✓			✓		
MPEG-1 software playback			✓	✓		✓	✓		
DVD/MPEG-2 software playback			✓	✓			✓		
QuickTime acceleration								✓	
3D Software Support									
Microsoft Direct3D			✓	✓			✓		
QuickDraw 3D RAVE								✓	
OpenGL			③	③		✓	⑥		
ATI 3D CIF ^④			✓	✓					
AGP			✓	✓		⑤	✓		

1. Additional drivers available from 3^d parties (including SCO and UNIXWARE)
2. Direct BIOS support ; ③ Available 1H98; ④ ATI's 3D API for the 3D Rage family
3. NT4.0 Service Pack 3 supports AGP devices, but does not provide support for AGP Texturing.
4. Dependent on NT5.0 release date; ⑦ Includes QuickDraw support